MELBOURNE AND METROPOLITAN TRAMWAYS BOARD

INSTRUCTIONS IN OVERHEAD CONSTRUCTION

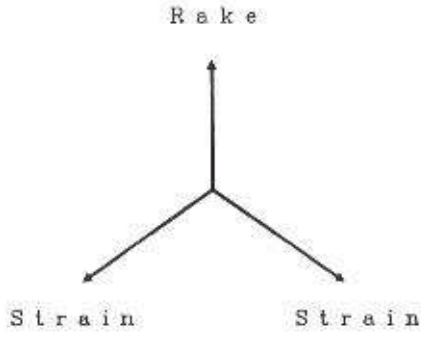
1. Hole Digging

A step must on no account be dug. Hole must be taken down at the same diameter all the way. When it is necessary to blast, the hole must be covered with heavy wood sleepers.

Special boring tool is to be used for digging hole below 3ft deep, if ground is suitable.

2. Pole Setting

All poles must be given exact rakes given in paragraph 4. Use special plumb for this purpose. In cases where poles are under strain in two directions, rake must divide the angle between them thus. All poles shall be set with tops approximately in line.



Concrete shall be mixed on footpath if available, otherwise small mixing platform to be used. Mix twice dry and twice wet, not using too much water.

3. Pole Base

Neatly finish off surface of concrete with trowel slightly above surface on footpath, sloping up all round from outside edge to pole. Apply plaster of 1 cement to 3 sand to concrete before it has set.

4. Rake of Poles

Poles shall be set with the following rakes:-

Steel Poles:	Anchor	1" in 3 feet
	Span	0.5" in 2 feet
Wood Poles:	Anchor	1.5" in 2 feet
	Span	1" in 2 feet

5. Stringing Trolley Wire

Mount trolley reel on shaft to run freely thereon. Anchor end to anchor or trolley already installed.

Maintain tension by brake on rim of wheel, never on the copper.

Pull to correct sag and tie to span with temporary tie.

Use long parallel faced clamps.

Use no cam come alongs, chains or other short grip devices.

6. Sag of Trolley

100 ft. Span

(a)	30°F	3.5"	2350 lb. tension
(b)	60°F	4.25"	1800 lb. tension
(c)	90°F	5.25"	1450 lb. tension
(d)	120°F	7.25"	1050 lb. tension

120 ft. Span

(a)	30°F	4.75"	2350 lb. tension
(b)	60°F	6.25"	1800 lb. tension
(c)	90°F	7.5"	1450 lb. tension
(d)	120°F	10.5"	1050 lb. tension

Sags vary as square of length.

7. Permanent Installation of Trolley

After the trolley wire has been temporarily tied up with the proper sags and the line anchored, the trolley wire must be carefully traced for twists or turns, and as this operation progresses, place line ears and hangers in correct position and attach.

Remove all kinks with a wooden mallet and block.

Upset all clamp screws of mechanical ears to prevent slacking back. File off ragged edges.

8. Trolley Wire Anchor Wires

Use heavy span wire, 5/8 inch turnbuckles, and egg insulators.

9. Location of Poles and Trolley on Curves

Poles shall be spaced and the trolley wire shall have pull overs located as shown on table hereunder, and the pull overs offset inside the centre line of track as shown on diagram herewith.

Use mirror gauge if track is in position, if track is not in position read offset diagram and add 8 inches for super-elevation (taken as 2 inches).

Thus for 100 ft. radius curve,	Offset from diagram	4 inches
	Add for super-elevation	8 inches
	Total offset at centre of curve.	12 inches

All offsets towards inside of track.

Radius of Curve (feet)	Spacing of Pull off (feet)	No. of Pulls between supports	Distance apart of poles (feet)
50	7	4	35
60	8	4	40
70	9	4	45
80	10	4	50
90	11	4	55
100	12	4	60
125	13	4	65

Radius of Curve (feet)	Spacing of Pull off (feet)	No. of Pulls between supports	Distance apart of poles (feet)
150	14	4	70
200-300	18	3	72
300-400	19	3	76
500	20	3	80
750	25	3	100
1000	33 1/3	2	100
1500-2000	50	1	100
Above 2000	100	0	100

10. Span Wires

Close Tie all loops, cut in egg insulators at 6 feet from pole and at 2 ft 6 ins" from trolley wire. Measure all spans at ground level and make up in shop, allowing for rake of poles.

11. Curve Wiring

All pull off points should be marked on the ground level and all necessary measurements for lengths of pull off wires and tie wires taken there from and supporting network made up accordingly. "After completion all nozzles to be given a coat of Biturene paint".

With new type of pull off no turnbuckles or span wire adjusters are required on outside of curve. Use span wire adjusters as may be required on inside of curve. All curves should be carefully watched and adjusted after cars start running.

12. Height of Trolley Wire

Adjust all spans so that trolley is 18 ft 6 ins" above rail at fittings.

13. Sag of Feeders

Sags shall be as follows:-

100 ft spans

60°F	17 inches
90°F	20.25 inches
120°F	23.5 inches

110 ft spans

60°F	20.5 inches
90°F	25 inches
120°F	28.5 inches

120 ft spans

60°F	25 inches
90°F	29 inches
120°F	35 inches

14. Painting Poles

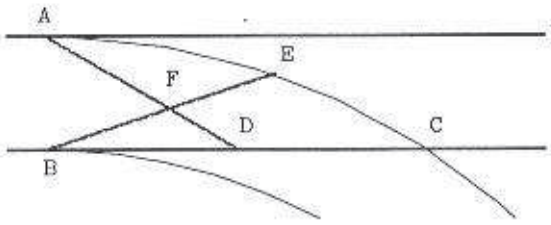
a) All steel poles shall be thoroughly cleaned down with scraper and wire brush before any paint is applied. They shall then be given two coats of approved paint, green on base and grey from 5 ft 6 ins upwards. All numbers shall be stencilled on in black, and all stopmarks in red, black and white. For 18 ins at ground level poles shall be given two coats of asphalt paint - 15 ins above and 3 ins below top of concrete.

b) Wood poles - after erection and completion of concrete base, the pole shall be given two coats of asphalt paint to a height of 18 ins above ground level.

c) Lettering - all poles shall be numbered.

15. Locating Frogs

All preliminary location of frogs should be made as shown on the diagram hereunder:



A & B = Ends of switch castings
C = Nose of track frog
D = Midpoint of BC
E = Midpoint of AC
F = Location of Frog

16. Erection of Crossing

All overhead crossings should be fixed in a bay of the trolley wire, i.e. pull off wires should not be attached to the crossing but to pull off fittings in positions to put the crossing between them. This gives a straight run through the crossing and minimises wear and dewirements.